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Background Paper 6

**FUTURE TRAINING AND RETRAINING:
NEEDS AND POTENTIALS**

Frank Feather

**Skill
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Leave Task
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NEEDS AND POTENTIALS**

Frank Feather

Global Management Bureau Inc.

March 18, 1983

This is one in a series of background papers prepared for the Task Force on Skill Development Leave. The opinions expressed are those of the author(s) and do not necessarily reflect the views of the Task Force or the Department of Employment and Immigration.



FUTURE TRAINING AND RETRAINING:

Needs and Potentials

Purpose:

In the face of Canada's economic potential in an increasingly technological and global marketplace:

- (1) To provide an overview of the national and regional needs for vocational training/retraining programs.
- (2) To identify short, medium and long-term skill development needs (on a sector-by-sector/region-by-region basis).
- (3) To designate policy options related to the specified types of programs and mechanisms that might be adapted.
- (4) To identify the role of government, education, business and unions in the implementation of these programs and mechanisms.
- (5) To identify the constraints and capabilities of these sectors in delivering such programs.

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Summary:

The planetary production site and the global supermarket are the new economic reality. At the same time, the world is being swept into a post-industrial and, eventually, a leisure society by the microchip and technological revolution.

These changes are radically restructuring Canada's main forms of "industrial" activity and causing fundamental shifts in employment patterns, both sectorally, provincially, and in terms of time spent at work.

Entire industries are in economic decline and/or are employing fewer people due to technological labour substitution. Canada's labour force is already predominantly white-collar as the blue-collar sector heads for a participation rate of no more than our primary industries.

At the same time, white-collar jobs are now threatened with technological change. We can expect participation rates in this sector to begin to decline as the service/recreation (leisure sector) increases in predominance.

These shifts have significant and long-lasting implications for manpower training and retraining in Canada. This report discusses the need for revamping the curricula at universities and vocational training/community college institutions. As well, the types of training required are identified and the need for continuous (life-long) re-training is discussed.

Finally, we identify several short-, medium-, and long-term policy options and mechanisms that might be considered. Each is discussed briefly in order to convey the main thrust of each option. The point is also made that retraining will be essentially futile without complementary changes in work patterns (shorter work-weeks, flextime, etc.) in order to make meaningful work available to all who want it whether they are adequately trained or not.

Finally, in light of this report's findings and conclusions, we briefly discuss the role of and impact on government, education, business and unions.

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Introduction:

"The skill, dexterity, and knowledge of a nation's people is the most powerful engine of its economic growth."

- Adam Smith
'The Wealth of Nations'
(published in 1776)

In the midst of massive global and technological change, it is imperative that Canada invest now in its people - in their health, their education, their literacy, their work skills - if the nation is to secure the economic well-being that awaits it.

This investment, already overdue, cannot be delayed. The world will not wait for Canada. Yet the pervasive and inevitable restructuring of global systems of human endeavour present unique opportunities for Canada. Simultaneously, the emergence of the global marketplace is accompanied by a technological revolution the likes of which mankind has never seen.

Taken together, these shifts are bringing about a globalized post-industrial era in which Canadians - if they equip themselves well - have the opportunity to play a leading part.

SECTION A - GLOBAL INDUSTRIAL RESTRUCTURING

1. Planetary Production Site and Global Supermarket

We are witnessing an inexorable shift of resource extraction and materials manufacturing towards those countries with more productive workers, social organizations and management.

Quite simply, those companies that extract resources and/or manufacture a product that can do so more cheaply and efficiently in lower wage societies will have a tremendous competitive advantage.

Similarly, products and services are going to be sold where they are competitively priced and where the mass industrial and consumer markets exist. With 70% of the world's people living in developing countries (to reach 75% by the year 2000) the largest markets are clearly in those countries. In addition, the markets of the developed countries - particularly North America, Western Europe and Japan - are fast becoming oversaturated with material goods. It therefore makes little economic sense to manufacture industrial products on the opposite side of the planet to which they are to be distributed and sold.

This radical shift in the process of extraction, production, distribution and sales is reinforced by the multinational corporation (MNC). It is estimated that the 400 largest MNCs control

about 30% of all the world's resources (material, plant, R&D, human, etc.). By the year 2000 this economic clout is expected to grow such that the 300 largest MNCs will control about 50% of the world's resources.

MNCs are truly trans-national in that they can move resources across the face of the planet almost at will. Thus nickel will not be extracted in Sudbury if it can be more cheaply and effectively brought to market somewhere else.

The planetary production site and the global supermarket are the new economic reality for Canadians.

This was recognized in a recent speech by Thomas d'Aquino, president of the Business Council of National Issues. "No longer", he said, "can we count on our vast material resources ensuring us a privileged position among economic powers." He went on to say that "the structure of the world economy is being transformed by a pronounced shift in industrial power away from North America toward newly industrialized countries."

2. Technological Revolution

Mr. d'Aquino also pointed out that "standard technologies are being transferred at a record pace to low-cost-labour countries better able to absorb new techniques."

"In the meantime", he concluded, "mature industrialized societies such as ours are being swept by a stressing technological revolution."

Unfortunately, most Canadians have yet to accept that micro-electronics is a "transforming technology" - like the invention of the steam engine, the automobile, and the automobile production line - which will change every aspect of our life.

Perhaps the extent of this revolution can best be grasped by the following data:

<u>Year</u>	<u>Number of Electronic Computing Devices</u>
1946	0
1960	10,000
1980	10,000,000

Through electronic mail, automatic information processing, and inter-office telecommunications facilities, the office of the future will be an entirely different place.

Microelectronic equipment is also transforming many industrial operations. The market for computer-aided design and manufacturing (CAD/CAM) will exceed \$500 million in Canada within the next four

years compared with \$125 million today - a growth rate of over 30% annually.

The market for robots in Canada was less than \$20 million in 1982, with about 250 robots in use across the country. A recent study by Carnegie-Mellon University predicts that by the year 2000, robots will supplant about 23 million factory workers (90% of today's complement!) in the United States. By the year 2025, robots could be handling virtually all manufacturing chores. Sales of the robotics industry will rise from \$89 million in 1980 to over \$4 billion by 1995.

Modernization, however, is no guarantee of domestic employment. The Atari computer firm has just announced that it will move its video game and computer manufacturing operations to the Far East, leaving 700 American workers unemployed. Similarly, MacMillan Bloedel's computerized sawmill at Port Alberni, B.C., gets 10% more lumber from its logs and employs 40 fewer people than the mill it replaced.

This is easily understood when the cost of robot labour is compared with that of human labour. Today, automobile assembly workers get an average of \$16 per hour. In comparison, a six-axis, servo-controlled, computer-driven robot, amortized over eight years, costs \$4 per hour. Robots also work round-the-clock.

By 1990, the initial cost of such a robot could fall from \$40,000 to \$10,000 for an hourly cost of only \$1. Meanwhile, if

current trends continued, human labour could cost \$30 per hour by 1990.

The capability of microelectronic technology is increasing by leaps and bounds. Thus the Japanese have developed a computer-controlled, multi-joint, three-finger manipulator for robots that can hold articles and tie knots as skillfully as human fingers. Laser technology is expected to give robots almost human touch and sight capability within 3 years. Similarly, Japan's mission to produce its Fifth Generation computer (G5) by 1990 will provide the workplace with an artificial intelligence machine that can read, write, instantly translate and speak any human language.

Clearly any company that produces a material, product or service that will be rendered obsolete by change is facing a dim future. So are its workers. A French estimate says that new office technology could leave 6 million jobless in that country. A British study puts 62% of all occupations at risk. Germany says up to half of all job categories are threatened. With between one-third and two-thirds of all jobs imperilled by the microchip, that could mean that 70 million people in Europe and North America would lose their jobs. In Canada, between 4 and 8 million jobs are at stake. All 12 million jobs now in the Canadian economy will be affected in varying degrees by technological changes.

3. Post-Industrialism and Leisure Society

The shape of Canada's work force has been changing rapidly since the onset of computerization and automation. Canada has been leading the shift to a so-called post-industrial society since the late 1950's and early 1960's. This shift is usually characterized by the number of people employed in the major sectors of the economy. It sometimes is referred to as a switch away from a manufacturing-based to a service-based economy. Others prefer to call it a switch to an information-based economy in that most of the new jobs are being filled by white-collar workers in knowledge or information-intensive jobs.

The following statistical table shows the magnitude of the shift that is occurring in Canada's labour force.

<u>Canada's Shifting Labour Force</u>								GMR	
	1951		1961	1971	1981	1982 (Dec)		Forecasts	
	<u>000s</u>	<u>%</u>	<u>%</u>	<u>%</u>	<u>%</u>	<u>000s</u>	<u>%</u>	<u>1991</u>	<u>2001</u>
								<u>%</u>	<u>%</u>
White-Collar	1,670	31.6	37.3	41.3	48.6	5,833	49.0	55.0%	61.5%
- Managerial	420	8.0	8.3	7.9	7.6	931	7.7	7.0	6.5
- Professional	385	7.2	9.7	12.5	13.5	1,631	13.7	15.5	17.5
- Clerical	578	11.0	12.9	14.8	17.5	2,062	17.5	21.0	24.5
- Sales	287	5.4	6.4	6.1	10.0	1,209	10.1	11.5	13.0
Blue-Collar	1,655	31.4	29.0	25.6	21.7	2,491	20.9	15.0	8.0
Transport/Comm.	331	6.3	6.1	5.0	3.5	455	3.5	3.5	2.5
Service/Recreation	514	9.7	12.3	11.6	15.1	1,849	15.5	18.5	21.0
Primary Industries	1,043	19.8	12.8	7.5	6.2	704	6.2	5.0	4.0
Others	64	1.2	2.6	9.0	4.9	547	4.9	3.0	3.0
TOTAL	<u>5,277</u>	<u>100.0</u>	<u>100.0</u>	<u>100.0</u>	<u>100.0</u>	<u>11,879</u>	<u>100.0</u>	<u>100.0</u>	<u>100.0</u>

As can be seen, the percentage of Canada's population employed in the primary sector (agriculture, mining, fishing, etc.) has fallen from 19.8% in 1951 to only 6.2% today. This sector accounted for about 90% of all occupations at the turn of the century.

The most dramatic recent shift is that between blue-collar and white-collar workers. In 1951, approximately the same number of Canadians were occupied in these two groups (31.4% and 31.6% respectively). While the number of blue-collar workers has grown from 1.7 million in 1951 to 2.5 million today, this group as a percentage of all occupations has fallen from 31.4% to 20.9%. In the last year alone, exacerbated by the recession, the number of blue-collar workers declined by 75,000 - the first annual decline recorded - and the percentage dropped almost a full point.

The white-collar group has shown dramatic growth since 1951, climbing from 1.7 million workers (31.6% of the labour force) to 5.8 million (49.0% of the labour force). Even during the recession of 1982, some 87,000 new jobs were filled in this group, showing the strength of the shift into this sector. Occupation types in this sector fall into four main categories:

	<u>% of Labour Force</u>	
	<u>1951</u>	<u>1982</u>
Managerial	8.0%	7.7%
Professional Groups	7.2	13.7
Clerical Workers	11.0	17.5
Sales Personnel	<u>5.4</u>	<u>10.1</u>
	31.6%	49.0%

The bulk of the new jobs created in Canada in the last 30 years have come in the last three of these categories: Professionals have increased from 385,000 to 1,631,000; Clerical from 578,000 to 2,062,000; and Sales personnel from 287,000 to 1,209,000.

If these trends are continued into the future, under normal circumstances we can expect the blue-collar group to decline further and the white-collar group to increase its ascendant predominance. Under this normal trend scenario, Canada's work force can be expected to show the following pattern:

	% of Labour Force		
	GMR		
	Forecasts		
	<u>1981</u>	<u>1991</u>	<u>2001</u>
White-Collar	48.6%	55.0%	61.5%
Blue-Collar	21.7	15.0	8.0
Service/Recreation	15.1	18.5	21.0
All Other (Primary)	<u>14.6</u>	<u>11.5</u>	<u>9.5</u>
	100.0%	100.0%	100.0%

By the year 2001, there would be as few people employed in the blue-collar sector (manufacturing, etc.) as in the primary industries. The Service/Recreation field will be as heavily populated as the blue-collar and primary sectors combined. These trends are backed-up by Raj Reddy, director of the Robotics Institute at Carnegie-Mellon University. He expects the population of employees in the manufacturing sector in the United States to drop from 25-28 million today to less than 3 million by the year 2010.

As can be seen, the information (white-collar) sector of post-industrial society has truly emerged while the service sector has also grown significantly since 1951 (from 9.7% to 15.1% of the labour force) and can be expected to continue to do so under existing trends.

However, an important caveat of futures forecasting is that "trend is not necessarily destiny". For example, if the white-collar group were to continue its present trend, it would sooner or later account for a full 100% of all occupations sometime in the 21st century. This is clearly not feasible.

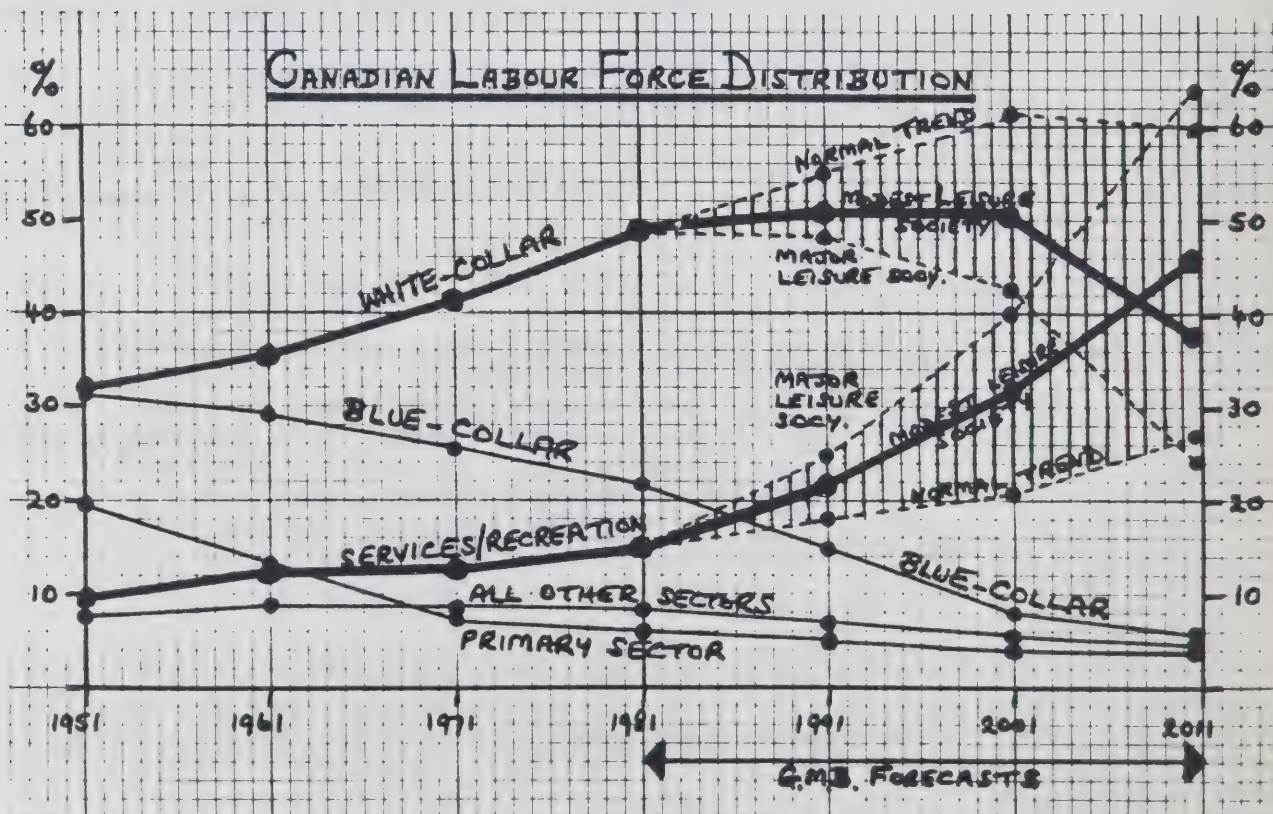
Indeed we believe that the so-called service society will eventually emerge. However, we prefer to refer to it as the leisure society. The reasons why the leisure society will emerge include at least the following:

- a) Continued rise of the service/recreation group in response to the needs of:
 - (i) Canada's aging population.
 - (ii) Worker demand for more free time to pursue leisure activities and knowledge in its own right.
 - (iii) Continued shortening of work-weeks, etc.
- b) The impact of automation is presently being felt in the blue-collar sector. This soon will begin to switch to the

white-collar sector where many more jobs are vulnerable to automation.

The driving force for automation is a human one. It is based on the human penchant for finding easier and more efficient ways of doing things in order to provide time for other activities (mostly intellectual) or for doing nothing at all - i.e., to create leisure time. Our drive for automation is being immensely successful. We are creating the leisure society we desire and crave.

Because of these trends, it is reasonable to develop scenarios for a modest leisure society and a major leisure society. The labour force trends under these scenarios are shown in the following chart.



Under the modest leisure society scenario, the growth in the white-collar sector would begin to fall off between now and 1991, stay steady through the 1990's and then decline rapidly in the first 10 years of the 21st century. By 2011, the white-collar sector could account for only 37% of the labour force compared with 49% today.

At the same time, the services/recreation (leisure society) sector would accelerate its growth pattern during the balance of the 1980s and reach 32% of the labour force by the year 2001 - the same percentage as were employed in each of the white- and blue-collar sectors back in 1951. By 2011, the leisure society sector would reach 46% of the labour force to become the predominant occupational group in Canada.

Under a major leisure society scenario, these cross-over trends between the white-collar sector and the services/recreation (leisure) sector would become more pronounced. The white-collar group would begin declining during the remainder of the 1980s and fall to only 42.5% of the labour force by the turn of the century - just 2.5% higher than the rapidly climbing services/recreation (leisure) sector. The more dramatic shift would occur in the first decade of the 21st century. At that time, the white-collar sector would fall to only 24% of the labour force while the services/recreation (leisure) sector would soar to 64% as compared with only 15.5% today.

We consider the modest leisure society scenario to be highly probable and the major leisure society scenario to be a possibility that may not occur until some 50 years later. The post-industrial leisure society is already beginning to emerge. It will be a full-fledged reality by 2010 under either of the above scenarios.

SECTION B - IMPACT ON CANADIAN INDUSTRIES AND JOBS

We are clearly in a period of industrial restructuring and as a result, what might be called structural unemployment.

In this new environment, companies have to globalize their production and marketing to the extent possible. To survive in the new economy, major corporations have to "think globally", confronting foreign competitors on their own turf.

Companies must also computerize and robotize their operations if they are to be truly competitive. However, while the technological revolution will clearly create vast opportunities for new industries, it will not necessarily prevent the old industries from serious decline into bankruptcy. Thus, while auto makers get high marks in their zeal for robotics and CAD/CAM techniques, they may simply be updating a dying technology. The Japanese are convinced that an entire car, right down to the engine block, can be built of ceramic and composite materials, eliminating steel, aluminum and other metals. Some industries will clearly win, others will clearly lose.

1. Industrial Sector Restructuring

To understand the extent of industrial restructuring already underway in Canada, it is useful to again look at employment levels within major industrial sectors.

The following table shows the recent trend of employment indices by industry sector, plus forecasts into the future.

Employment Indices By Industry Sector
(1961 = 100)

	<u>G.M.B. Forecasts</u>						
	<u>1974</u>	<u>1978</u>	<u>1982</u>	<u>1987</u>	<u>1992</u>	<u>1997</u>	<u>2002</u>
Services	224	261	304	352	400	450	500
Finance, Etc.	167	199	218	247	275	300	330
Trade	166	174	172	180	182	184	186
- Retail	171	184	187	195	203	210	220
- Wholesale	155	154	148	145	142	139	136
Transportation, Etc.	125	133	140	151	160	170	180
Manufacturing	134	128	119	112	106	100	93
- Durable	149	140	123	110	100	90	80
- Non-Durable	121	118	116	114	112	110	107
Mining	116	119	125	125	120	110	100
Construction	117	100	89	78	70	65	65
Forestry	<u>87</u>	<u>81</u>	<u>74</u>	<u>60</u>	<u>54</u>	<u>49</u>	<u>44</u>
Composite	143	147	148	152	154	156	160

While the manufacturing and primary industries are declining to below their 1961 level of employment - a trend that will accelerate as a result of robotization - the new sunrise industries are taking their place.

If these sectoral groups are examined in greater detail, i.e., relative to their underlying industry types, the rates of decline and growth are highlighted further. The following tabulations show the declining and growing industries.

Industrial Sector Restructuring

<u>Previously Declining</u>		<u>Growing/Booming Industries</u>		
<u>Industry</u>	1982 Employment Index (1961=100)	<u>Industry</u>	1982 Employment Index (1961=100)	Index Change (1974-1982)
Telegraph/Cable	67	Business Services	363	+88
Leather	70	Sundry Services	330	+56
Tobacco	70	Personal Services	283	+88
Railway Transport	72	Recreation Services	271	+72
Forestry	74	Financial Inst.	267	+86
Dairy Products	80	Oil & Gas	250	+86
Shipbuilding	80	Air Transportation	240	+34
Clay Products	82	Broadcasting	208	+55
Biscuit/Bakery	85	Food Stores	204	+40
Appliances	85	Insurance/Realty	200	+51
Fabricated Metals	87	Automotive Stores	196	+11
Construction	89	Telephone	193	+45
Textiles	90	Urban Transit	192	+59
Clothing	90	Dept. Stores	185	+18
Wood Products	90			
Aircraft Parts	90			
Water Transport	91			
Metals Mining	94			
		<u>Recently Declining</u>		
		Non-Metallic Minerals	102	(-30)
		Furniture	105	(-52)
		Metal Fabricating	115	(-43)
		Manufacturing	119	(-15)
		Electrical Products	125	(-29)
		Machinery	155	(-19)

There is little question that growth in the services and high-tech industries will more than make up for the decline in the old manufacturing and primary industries. Projected growth in the computing industry alone in the next four years is enough to offset the combined losses in the shrinking steel and auto industries. And new jobs go with the growth - easily sufficient to replace the jobs lost in the old industries. For example, Hewlett-Packard, one of the medium-size high-tech companies employs 57,000 people, Xerox more than 100,000. Two more companies of this size in the 1980s will make up for all the jobs lost in the auto industry.

2. Regional Restructuring

There has been a similar restructuring among the Canadian Provinces as shown by the following table.

	<u>Employment Indices by Province</u>			<u>Changes</u>	
	(1961 = 100)				
	<u>1974</u>	<u>1978</u>	<u>1982</u>	<u>1974-82</u>	<u>1978-82</u>
Alberta	163	203	242	79	39
British Columbia	167	174	172	5	(2)
Saskatchewan	130	143	157	27	14
Ontario	148	151	153	5	2
Atlantic Provinces	139	137	143	4	6
Manitoba	128	125	127	(1)	2
Quebec	<u>130</u>	<u>127</u>	<u>120</u>	<u>(10)</u>	<u>(7)</u>
Composite	143	147	148	5	1

Most of the growth in the last decade has occurred in Alberta and Saskatchewan, predominantly as a result of the OPEC energy shocks in 1973 and 1979. However, these trends will not necessarily continue in that future employment patterns will be dictated by the declines in the old industries and the growth in the new industries.

In the primary sector, for example, the labour force has expanded over recent years in Quebec, the Atlantic Provinces and British Columbia. Every other province has recorded a decline, particularly Ontario where most of the employment in these sectors has been located.

Labour Force by Province
- Primary Sector -
(000's)

	<u>1979</u>	<u>1982</u>	<u>GMB Forecasts</u>		
			<u>1985</u>	<u>1991</u>	<u>2001</u>
Ontario	197	188	170	150	130
Quebec	120	127	125	120	115
Alberta	107	104	95	85	75
Saskatchewan	104	94	85	75	65
British Columbia	64	68	65	60	55
Atlantic Provinces	77	76	75	75	75
Manitoba	<u>52</u>	<u>47</u>	<u>40</u>	<u>35</u>	<u>30</u>
Canada	712	704	655	600	545

As the primary sector continues to decline, the greatest impact will fall on Ontario and the Prairie provinces.

In the processing (manufacturing, etc.) sector, the labour force is heavily concentrated in Ontario and Quebec which have suffered the largest job losses in this sector. The four western provinces have all gained in this sector as they have attempted to gain their own manufacturing base and as manufacturers have come in to support the energy sector.

Labour Force by Province
- Processing Sector -
(000's)

	<u>1979</u>	<u>1982</u>	<u>GMR Forecasts</u>		
			<u>1985</u>	<u>1991</u>	<u>2001</u>
Ontario	786	773	750	700	650
Quebec	508	489	450	400	350
British Columbia	167	173	160	140	120
Alberta	98	109	100	90	80
Atlantic Provinces	121	119	110	95	80
Manitoba	62	64	60	55	50
Saskatchewan	<u>34</u>	<u>37</u>	<u>35</u>	<u>30</u>	<u>25</u>
Canada	1,776	1,764	1,665	1,510	1,355

As the manufacturing sector continues to decline, all provinces will lose jobs to this sector. The labour force in Canada will decline by over 400,000 jobs in this sector by the year 2000.

The other major sector in decline is the construction industry. Since 1979, only Alberta and British Columbia have increased their labour force participation in this industry. In 1982 alone, the industry lost 37,000 jobs Canada-wide. This trend is expected to continue with Quebec bearing the brunt of the industry's decline.

The manufacturing and construction sectors are particularly hard-hit by the technological revolution. In 1982, Canadian manufacturers operated at less than 70% of production capacity. Among the hardest hit industries were wood (54%), furniture (52%), primary metals (57%) and non-metallic mineral products (54%). There were 194,000 fewer jobs in manufacturing in 1982 than 1981, a drop of 9.1%.

These labour trends will be exacerbated as firms scramble to automate, striving for efficiency and growth. On a regional basis, since the bulk of the service sector and the new computer industry is located in Ontario, that province - while feeling the greatest loss of manufacturing jobs - will be cushioned somewhat by the growth of the service and high-tech sector. At the same time, however, this faces Ontario with the dual problem of finding and training people to fill the high-tech jobs while at the same time retraining people in newly-robotized manufacturing facilities and computerized electronic offices.

The location of high-tech industries is also important in discussing regional restructuring. Thus, for example, many of the

companies currently centred on U.S. Route 128 or in Silicon Valley, California, are looking elsewhere for expansion because the costs of labour, housing and land have become excessive. In the U.S.A., Michigan, North Carolina, Arizona and New Hampshire have been especially active in seeking to foster high technology and are meeting with some success.

The turnaround in New Hampshire provides a dramatic example of industrial and regional restructuring. Today, 65% of New Hampshire's work force labours in electronics, instrumentation and metals. Only ten years ago, 65% worked in shoes, textiles and apparel. The state's five top employers now are high tech in whole or in part. The key to this success is placed on the state's hospitality to business. However, the state also was able to offer all the things a high-tech company needs, including low cost buildings (retro-fitted textile warehouses/mills) and skilled (re-trained) labour.

The Silicon Valley phenomenon referred to above could duplicate itself in the Ottawa Valley. Perhaps some of these companies could become attracted to low cost resources in Montreal as the city's textile industry continues to wane. Also, since the high-tech sector does not have to be located close to natural resources, it can locate in almost any remote location. This offers tantalizing possibilities for traditionally high areas of unemployment (e.g., Newfoundland) or newly declining towns and cities which threaten to

become ghost towns as mining companies close down or lone manufacturers down-size their operations.

3. Employment Restructuring

If it were possible to know the geographic and sectoral structure of the job market in the years ahead, it would of course be relatively easy to direct people to those areas where they are most likely to find jobs. In addition, schools and universities would find it much easier to train young people for the jobs that would be available.

But making such forecasts is extraordinarily difficult, because new technology is constantly changing the nature of the skills that are needed, making some occupations obsolete and creating others in a manner that seems to be totally unforeseeable.

In addition, the job market will be heavily influenced by the overall prosperity of the economy in general, of specific industries, and of specific regions of the country.

In an attempt to pinpoint the best industry bets for Canada, Prof. Uri Zohar of York University in Toronto has identified the following for good job growth:

- food and beverages
- rubber and plastics

- transportation equipment
- electrical products
- non-metallic minerals
- chemicals

He selected these because they also provide labour efficiency and foster economic growth. On Zohar's list of poor performers on all fronts are: textiles, knitting mills, wood products, primary metals, metal fabricating and petroleum and coal products.

But this rudimentary analysis only looks at the old industries.

Service industries have provided thousands of jobs in Canada since 1951. Today, however, many of those same jobs - in banking, insurance, retailing, secretarial, and clerical work - are the microprocessor's principal targets.

Meanwhile, other jobs will appear with almost magical suddenness. Thousands of new jobs will be created in the next few years for engineers, engineering aides, laser technicians, drafters, assemblers, and computer analysts and programmers. There will also be a severe shortage of trained machinists to make robots and electronic devices. Other new jobs will open up in fiber optics, in genetic engineering, and in computer applications in offices and homes.

In a general sense, some of the biggest impacts in manufacturing will hit those people who are just above the shop-floor level. Many production-related supervisory functions can be folded into a computerized management system. Thus, computer programmers will replace production expeditors and production-control personnel.

Some of the jobs in growing supply in Canada will be: electronics engineers, electronics and computer technicians, mechanical engineers, programmers, CAD/CAM and robotics experts, technical systems analysts, machinists and tool and die makers (for electronics firms), and draftspersons (again for the electronics industry), information planners, physicians, lawyers, health care paramedics, sanitation engineers, bartenders, cooks, hotel keepers, nurses, social workers, therapists, financial managers/advisors, food service workers, space industry technicians, oceanography engineers, roboticists, genetic engineers, bio-technologists.

On the decline are: civil engineers, computer operators, factory foremen, file clerks, secretaries, accountants, social scientists, PR and personnel officers, retail salespersons (electronic retailing will take over 20% of all retail sales), spray painters, assemblers, molders, welders, textile workers, boiler tenders, machine-tool operators, electroplaters, high-school teachers, college teachers, postal workers, bakers, keypunch operators.

Predicting such future employment prospects is hazardous due to the lack of a reliable occupational forecasting program in Canada.

The new Canadian Occupation Projection System (COPS) should fill the gap but, until it is available, projections have to be based on the forecasts prepared for the United States by the Bureau of Labor Statistics (BLS) and private forecasting mechanisms such as have been used for this report.

With this caveat, it nevertheless is clear from the foregoing that we are experiencing a massive restructuring of Canada's labour pool.

If a good part of today's unemployment is "structural" - the consequence of a chronic mismatch of supply and demand in the labour market - it is also caused by a mismatch in the human needs for meaningful work in the face of technological change and the emerging leisure society.

All major technological revolutions have traditionally brought about a reduction in the so-called statutory work-week. This has not yet occurred with the micro-electronic revolution.

Yet a growing number of employees now place a higher value on non-working hours and are willing to accept smaller wages if they can have more time to themselves. As a result, a number of alternatives to the standard nine-to-five, 40-hour work-week are gaining momentum: flextime, compressed workweek, job sharing, work sharing, part-time shifts, sabbatical leaves, longer vacations, and gliding retirement.

These innovations have, however, been slow to catch on and/or have been given little encouragement by labour, management, and government in Canada. Even when they are adopted, the focus of attention remains on the outmoded 40-hour work-week. Yet several studies have shown that a reduction in the work-week is essential if we are to avoid massive unemployment - even with the new job-creating industries coming on stream. A so-called work-week of 30, 28 or even 24 or 20 hours is both inevitable and necessary if we are to provide meaningful job opportunities for all.

This again, is evidence of the labour restructuring that is occurring inexorably in Canadian society.

SECTION C - IMPLICATIONS FOR TRAINING AND RETRAINING

Over the next 20 years in Canada, global restructuring, industrial restructuring, employment restructuring, technological change, and the emerging leisure society will affect between 4 and 8 million existing jobs. We will see a radical restructuring of work as current skills are devalued and new ones are created at an ever-increasing rate.

At the same time, we shall see tomorrow's workers graduating from education programs that no longer equip them with the skills required for meaningful employment in an unanticipatedly changed world.

These shifts constitute both our problem and our challenge. The problem lies in dealing effectively and fairly with the immediate serious dislocations afflicting Canadian workers. Beyond that, our challenge is to see the future as clearly as possible so that we can mobilize our resources and invest in the skills of tomorrow's workers.

We must respond in two ways:

- 1) A re-emphasis on excellence in education; and
- 2) Creative new training and retraining programs.

1. Formal Education

The scientific, technical, and language skills of our young people has declined to the point of embarrassment. Hardly any of

our students (certainly less than 10%) study even one year of physics. Most study only about half of the mathematics and science studied by children in many of Canada's competitor countries. English language admission standards to Canadian universities have had to be lowered in order to cater to the functional illiteracy of many of our graduating high school classes.

This has come about through the over-concentration on arts subjects. Indeed, the University of Toronto complained about two years ago concerning the poor demand for arts classes and the over-demand for management school programs. Furthermore, the U. of T. announced that it would no longer accept credits in computer studies, accounting, and family studies for admission purposes.

Clearly the universities of this country have not been concentrating on preparing people to live in the Canada of the future toward which students understood they were heading.

In addition, innovation and research and development in this country are severely lacking. Again much of the responsibility for this lies with the university system. Most university curricula do not contain any courses on creative thinking or modes of reasoning and tend to stress linear outdated subjects.

Furthermore, in the age of the microchip, educators still debate whether or not to allow the use of calculators in class. Meanwhile their students have microcomputers at home.

2. Vocational Training

Canada has been fortunate to be equipped with a network of Community Colleges across Canada which have been trying valiantly to provide vocational training skills demanded by a fast-growing workforce.

Classrooms are filled, day and night, by a general public which understands full well its need for vocational training and retraining.

These attempts are not sufficient. It is almost impossible to receive training in robotics in Canada.

3. Types of Training Required

Regardless of which institution provides it, Canadians need training and retraining in the following areas:

- a) physics, science, mathematics, biology, computer science
- b) electronics, robotics, technology planning and management
- c) global product mandating, international marketing
- d) creative thinking and innovation
- e) life-style skills to be able to adapt to change
- f) career/job counselling, social skills, communication
- g) leisure counselling
- h) technical vocational skills of all types

4. Continuous Retraining

When previous generations graduated from high school or college they were considered to be trained for life. Even the last generation thought that way - and it is the last generation that has set about to teach the new generation.

Suddenly, many lucky enough to have jobs are finding themselves going nowhere - locked into a dead-end career - and this is likely to be exacerbated by increased levels of automation in the office and the factory.

Others, who have lost their jobs, or have graduated and never had a job, are being forced to rethink the careers they've chosen.

"The days when, by and large, a person could be trained once to work for the rest of their life have gone by the board," says Allan Ebedes of the Toronto School of Business. Even in relatively modest cases of automation, workers can expect to have to take retraining and upgrading courses every two or three years. Changing markets will mean that workers might have to change jobs or be completely retrained every 5 or 6 years.

As much as 40% of Canada's work force already needs retraining or upgrading or will need it in the next few years of this decade. By 1990, this group plus perhaps another 20% of the workforce, will need to be trained all over again.

This could mean at least 1 million workers would have to take some form of retraining every single year - a tremendous throughput with which our existing mechanisms probably will be unable to cope. What makes this even more difficult is the lack of coordination of educational policy across Canada and even within provinces where, by and large, the universities are heavily favoured over community colleges in terms of the resources placed at their disposal.

On top of all this, of course, the move toward a leisure society has other ramifications. A later start in working life might be expected with higher education available to all until the age of 25 or thereabouts. On the other hand, with cheap home computers a child can begin his/her working life at the age of 7 or so. Indeed, when computers provide inexpensive education facilities, learning (and, hence, retraining) will become a lifelong domesticated activity - as natural as watching television today - and as time-consuming.

Thus does the ubiquitous electronic environment transform every facet of life.

SECTION D - POSSIBLE POLICY OPTIONS

The amount of work which needs to be done in Canadian society is decreasing, particularly due to the microelectronic revolution and the emerging post-industrial leisure society. At the same time, the available labour pool is expanding.

On the basis that all Canadians should have, and do indeed seek, meaningful "work" with which to occupy their lives, policy options which are adapted will have to focus on providing skills to all those who wish to work. At the same time, the available work will somehow have to be allocated out to the available labour pool on some equitable basis.

The following policy options, not all of which are original ideas, all focus on the need to equip all Canadians to secure a satisfying amount of meaningful work within an emerging post-industrial leisure society.

1. Short-term Options

The challenge of the present and the immediate short-term is to find meaningful work for unemployed Canadians - whether they are structurally unemployed or not.

Clearly, it would be futile to begin any skills retraining programs for these unemployed people if they are still unable to find a job.

(a) Shorter Work-Week

As an immediate measure, the statutory work-week should be reduced by 10% in order to free up meaningful work opportunities for all Canadians. This should be accompanied by a legislative ban on overtime to prevent abuses and to prevent labour costs (and, hence, price inflation) from rising.

If necessary, the program could be phased-in by cutting the work-week by 5% immediately plus the ban on overtime. This reduction could be increased to 10% after 6 months in order to ease the burden on wage earners who would have to accept lower pay. However, it is suggested that the employee absorb 50% of the pay cut in lieu of the benefit of extra time off. The government could finance the other 50% by way of income supplement. This could come from the U.I.C. fund and be paid by way of adjustment to the employer's corporate statutory deduction remittances, i.e., firms would cut employee wages by only 5% over one year and deduct a further 5% (income supplement) from their monthly U.I.C. remittances. The firm thus gains 10% to pay to an additional employee who must be hired via Canada Manpower, thus reducing the drain on the U.I.C. program. If necessary, the firm should also receive a training incentive to encourage it to retrain the new employee.

(b) Job Sharing/Retraining

The present job sharing scheme whereby an employee works 4 days and is paid by the U.I.C. fund for 1 day (to stay at home!) is short-sighted folly. While similar to a reduction in the work-week for that employee, if he/she is to be paid by the U.I.C. fund then the employee should be paid not to stay at home but to take training courses to equip him/her for alternate future employment.

The existing policy should be changed immediately in this regard.

(c) Youth Employment Scheme (YES)

The present level of unemployment is most severe in the 15-19 year-old age bracket, particularly in Quebec and the Atlantic provinces.

A special Youth Employment Scheme (YES) should be launched immediately. This could be comprised of several parts:

- (i) A 2-day intensive seminar on "Job Market Tactics" to better equip young people in their search for employment. Global Management Bureau, Inc., has developed and taught such a course in conjunction with Sheridan College in Oakville, with positive results. Generally

speaking, young people have had no coaching in how to profile their skills vis-a-vis the available job market or on how to obtain interviews. This course effectively meets this need. (It can, of course, be applied to any age group of displaced workers.)

- (ii) Short-term (1 to 6 months) "internships" with firms (while on U.I.C. looking for a job) at no cost to the firm other than staff time devoted to orienting the intern to the workplace of that particular firm.
- (iii) Part-time or Seasonal Jobs paid for by U.I.C. for 2 months, then 50/50 with the firm for 2 months, both at minimum wage levels. This can provide the opportunity for an employee to prove him/herself to a prospective employer and can result in full-time employment being offered.

Such a scheme would at least solve the immediate challenge of taking Canada's unemployed youths off the unemployment rolls.

(d) Local Initiatives Program (LIP)

While the LIP program was not without its faults, an option might be to revive it in some modified form in an attempt to deal with the present short-term crisis in unemployment.

(e) High-Tech Salary and Training Incentives

Governments could consider paying a large portion of the salaries of employees of advanced technology firms starting up new operations in Canada. These funds would be used to help the new venture get off the ground and provide it with an incentive to train people that it couldn't otherwise hire on the job market.

(f) Manpower-By-Results (MBR)

Officials at the government's manpower centres should be paid partly by results, which in some centres seem to be practically nil. They should help unemployed people compile a skills inventory profile and find out their willingness to do weekend work, shift work, almost anything. Then they should badger employers about the ways in which they could reduce costs by taking advantage of this willingness. Manpower staff should thus be held accountable for job placement as are employment agency staff in the private sector. Such "Manpower-By-Results" would determine the effectiveness of the entire Manpower program. Poor performers should be counselled and, if necessary, sent on training courses to help improve their job-placement effectiveness.

(g) Goodwill Employment

Employers should be encouraged to raise their intake of trainees for social or goodwill reasons. If necessary, the government could subsidize the salaries of such trainees or allow the firm to write off the trainee's salary as a goodwill donation or to claim a tax credit.

(h) Training and Relocation Centres

Another option might be to set up pilot retraining centres in areas where employment is most hurt by industrial and technological restructuring (e.g., Sudbury, Hamilton, St. Catharines, B.C. logging communities, Montreal needle trade areas, etc.). Such retraining centres could be operational by mid-summer to begin their retraining classes and to provide job skills inventory and job search services for displaced workers. A centre like this in Detroit has retrained auto-workers as machinists, draftsmen, computer operators and robot repairers. Despite the depressed auto market, more than 60% of these trainees have been placed in new jobs.

(i) Employer-Provided Job Centres

The Eaton Corporation of Cleveland offers outplacement services at some of its locations for laid-off management employees. The firm makes long-distance phone lines and

secretarial services available and provides counselling in job search, interview techniques, and resume preparation.

Such centres should be encouraged in Canada. It would greatly assist displaced workers, many of whom have to learn how to go back to the job market after being continuously employed for long periods of time.

2. Short- to Medium-Term Options

Even though the short-term level of structural unemployment might be addressed by short-term policy options such as those outlined above, it is clear from the earlier sections of this report that the workplace will continue to be buffeted by change in the late 1980's and early 1990's.

This change will be manifest by a continued decline of the blue-collar sector, a probable levelling off in the white-collar sector, and a significant upturn in the service/recreation (leisure society) sector by the mid 90's.

While white-collar workers have and are facing the need for retraining due to technological change, by and large they have not experienced the job displacement that will begin in the mid-term future.

Clearly, Canada is going to be faced with varying levels and types of structural unemployment and job redesign for the next

several decades. Therefore, there is a need for more permanent and long-lasting policy options and mechanisms to be put in place at an early date.

(a) Traineeships

To ensure that never again will Canada's youth be faced with today's abhorrent level of unemployment, opportunities should be created for people in the 15-19 age group as part of a new system of traineeships. Traineeships would entail a combination of training and employed work organized jointly by employers, unions, educational authorities and vocational training institutes and organizations. The government would pay a portion of the trainee's wage to the employer and would cover the cost of training.

(b) Individual Training Account (ITA)

As the number of young people in the population diminishes in relative size, policy may have to move away from programs to help new workers enter the labour force and focus on developing plans to help with re-entry, upgrading of skills, and eventual withdrawal from the labour force into early retirement.

One particularly interesting approach that might deal with this is something called an Individual Training Account.

Through this mechanism, displaced workers or those in need of retraining could have their needs met.

An account would be established for every one of Canada's payroll workers. It would be funded by contributions from both workers and employers. Workers would use the money in the account to cover retraining and relocation costs if they are displaced. Any unused funds at the time of retirement would be vested in the employee with interest.

Such a plan, being advocated by Senator Gary Hart of Colorado (and a U.S. presidential aspirant) would create a new set of incentives sadly lacking in traditional job training schemes. First, people would be unlikely to take frivolous courses when their own money was at stake. While this would not necessarily be the case, conditionality governing qualified courses could be built into the program. Second, an ITA would put pressure on companies to avoid lay-offs that would cost them their share of the accumulated funds. It might even encourage them to innovate by opening up new divisions which could absorb the workers displaced from divisions with declining productivity. Third, an ITA could decrease labour turnover (which is costly to employers) since a worker who quits would lose the employer's share of the fund.

This potential mechanism certainly seems to offer a longer-term solution to retraining needs. Ford Motor Company

has started a similar scheme and, as part of a new union contract in the U.S.A., is putting 5 cents per hour into retraining programs for each employee.

(c) "Educare"

Psychologist Seymour Sarason has suggested that governments might institute an "educare" program similar to Medicare. Every employee would be entitled to return to school for a specified length of time at public expense for further education, training, or retraining. The employee would accumulate "educare" credits which he/she could cash in regardless of whether or not a career change was a matter of choice or a result of changing employment patterns. Clearly, again, the type of courses selected would have to be controlled to prevent frivolous use of public funds.

West Germany has a similar program whereby every adult has an entitlement of 2 years full-time training during which period he/she receives a graduated income subsidy of up to 90% of the last salary earned - as much as 100% for low-income earners.

This scheme clearly has various attractive features. Alternatively it could be combined with the Individual Training Account (ITA) option outlined above.

(d) Computer Literacy Instruction Program (CLIP)

A majority of people fear, or at least do not understand microelectronic technology. To overcome this fear, we must enhance public awareness and understanding of the technology. One way would be to offer Computer Literacy Instruction Programs (CLIP) to not only orient Canadians toward the technology but also to get them to start using it. Most of the Telidon units scattered throughout shopping centres stand unattended and unutilized. A possible mechanism to overcome this fear would be to operate CLIP programs in such settings as "computer camps", etc. Simple pieces of equipment also could be set up in Canada Manpower centres, post offices, and other high-traffic government facilities.

3. ~~Medium-~~ to Long-Term Options

The foregoing program options, to the extent that they are adopted should be revised, updated, replaced, or cancelled on a regular basis in response to the continued restructuring of the Canadian workplace.

For the longer-term, we must begin now to educate the next generation of workers in a different fashion than has been the case to date. As indicated earlier, educational curricula must be "futurized" to provide for creative thinking and innovative skills, future planning skills, life-style skills, and leisure skills, among others.

The leaders of Canada's organizations in the years after 2000 have just started in kindergarten. They must be able to work with computer technology just as comfortably as we have worked with pen and paper.

Similarly, our training and re-training systems must be made so anticipative of change that never again will a worker have to be laid off because that person lacks the skills to do a job. At least, if they are laid off, they should have the skills to walk straight into another job where there is high demand for workers.

This is no utopian dream. Based on the leisure society scenarios outlined earlier in this report, this does not necessarily require more mechanisms than have already been outlined. A permanent retraining scheme such as ITA or Educare should be all that is required in terms of mechanisms.

4. Role of Government, Education, Business and Unions

However, even such a long-term mechanism will not stay viable unless government, business, education and labour unions play a full part to ensure the mechanism stays responsive to anticipated future change.

While the COPS system will go a long way towards improved forecasting of occupational restructuring, as we have seen, technological change occurs so fast that jobs can be made obsolete from

one year to the next. This is not very conducive to the effective management of future change.

It might be prudent to form a Canada-wide multi-level task force (involving governments, business, education, labour and R&D institutes) with a mandate to keep an eye out for future impacts on employment patterns. Perhaps to be called the Canadian Employment Restructuring Taskforce (CERT), such a group might fall under the auspices of the Ministry of Employment and Immigration and work closely with the COPS group.

Only with such Canada-wide cooperation, can the nation avoid a repeat of the present unemployment crisis as we move into the post-industrial leisure society.

5. Impact on Government, Education, Business and Unions

- (a) Governments across Canada must do a better job of coordinating the country's educational and vocational training mechanisms. The COPS system must be made operational as soon as possible and its prognostications published regularly and as widely as possible in order to alert other sectors and the public at large as to future employment patterns. We want no more surprises. In addition, a variety of short-, medium- and long-term mechanisms similar to those outlined in this report must be implemented as hastily as is feasible. In addition, governments should sort out and rationalize the vast array of

incentives that it now offers to a variety of industries, mostly older ones that are in an inevitable decline. The CERT mechanism outlined above, in cooperation with the Business Council of National Issues, should advise government on which industries to support through incentive programs. These programs should be in harmony with the post-industrial revolution so as to smooth out its change impacts and so as to capitalize on Canada's economic opportunities within the context of the global marketplace. In the end, it must be recognized that the only logical solution to long-term mass unemployment lies in a redistribution of work and leisure through employment restructuring, lifelong worker education and retraining, and implementation of non-traditional work patterns.

- (b) Education institutions must revamp their curricula to ensure Canada has the right mix of technical skills for the new technological age. We doubt that universities can meet this need due to their over-focus on intellectual pursuit of knowledge and arts for their own sake. In the long-run, as we move into the leisure society, this may be a good thing. In the interim, vocational training and retraining should be left to the community college system which, along with business and private training institutes, possess a well-balanced resource base of workplace-experienced teachers and modern technology. However, both sets of institutions must revamp their curricula to include the new skills outlined earlier. Even so, we are concerned that these institutions cannot meet the throughput capacity needs of the millions of workers who will require to

be trained and retrained. Either their budgets must be vastly increased or additional and supplementary kinds of training centres must be established across the country. Like the Canada Manpower centres, all these educational institutions must be made accountable for their performance on some kind of "graduation-and-employment-by-results" basis. Good education is a prerequisite to Canada's technological and economic progress.

(c) Business must place far greater emphasis on internal career planning and training and development - to invest in its own future by investing in its human resources and enabling them and itself to become proactive to post-industrial revolutionary change. Business also might consider funding educational programs at universities and colleges in the future demand areas of technical and vocational training. As well, business must be far more innovative in its R&D activities and, just as important, in introducing new work patterns such as flextime and short work-weeks into its post-industrial operating environment.

(d) Unions, at all costs, must avoid the temptation to become neo-Luddites relative to the introduction of new technologies into the workplace. Rather, they should adopt a progressive stance by trying to protect worker employability instead of jobs per se. They should thus become involved in employee training and retraining schemes and should campaign for more leisure-society-oriented work patterns.

Conclusion

In the pervasive change of the post-industrial revolution lies unprecedented opportunity for Canada.

To grasp this opportunity, governments, education, business and unions must work together to avoid the dangers of being left behind.

This requires a reconstruction approach to capital formation, tax incentives, marketing, research and development and, above all, human resources education, training and development.

The basic neglect of education and training will short-change Canada's economic future. The nature of the change before us demands that we cast off old ways of thinking, old analyses, old solutions.

This report has shown that we must do nothing less than trade the familiar and comfortable for the new, the challenging and the difficult. If we can do that and train Canada's people for the future, there is no doubt that this country can obtain its fair share of the post-industrial global marketplace - and all the rewards that it will bring.

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